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BEHAVIORAL ANTHROPOLOGY: A REVIEW OF MARVIN HARRIS' CULTURAL MATERIALISM[1]

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Once upon a time men and women followed, chased, or guided herds of Pleistocene Megafauna (woolly mammoth, cave bear, giant elk) across the grasslands south of the glaciers in the northern hemisphere. Band members of both sexes and many age groups followed wounded prey, scavenged carcasses, and stalked young animals. The continual movement (perhaps 1200 miles per year between campsites) required to follow the infrahuman herds was incompatible with having large numbers of children to carry about. The high protein, low carbohydrate meat diet of the bands, combined with frequent nursing (Lee, 1979), probably contributed to long periods of lactation and to later onset of menstruation, both of which delay ovulation and decrease the number of children each woman is likely to produce in a lifetime. This birth control procedure combined with a nonviolent form of infanticide based on neglect may have maintained a stable human population of perhaps 100,000,000 persons (Harris, 1977, p. 155; hereafter cited as *Cannibals and Kings*) for perhaps three million years (Harris, 1979, pp. 67-68; hereafter cited as *Cultural Materialism*). The potential human breeding population over this time could have numbered 600 x 10 to the 21st power (*Cannibals and Kings*, pp. 16-17). Because the human population did not begin to increase significantly until about 3000 B.C., some alternatives to raising all the children must have been practiced.

In such a transportable society, groups were ill-defined. Individual pairs or families joined or left a band of, say, 25 to 50 persons at different places, at different seasons, during changes in hunting success, or during intragroup quarrels. Having separated from its parent population, a divergent group could enjoy a standard of living equal to the one they had left.

The human bands ate not only meat but many different kinds of plants and seeds as well. They also tracked ripening seeds, sometimes harvesting part of a crop, sometimes diverting melt waters to irrigate particular fields, sometimes transplanting mature specimens to different areas, sometimes actually planting seeds before leaving an area (*Cultural Materialism,* p. 86). Band member also kept infrahuman pets. Long before sedentary agriculture came into fashion, humans had engaged in the component repertoires that together constitute the behavior we call farming. This behavior appeared in the Indus, the Yellow, and the Mekong River valleys, the Mexican Highlands, and coastal Peru as well as the more familiar Tigris and Euphrates River valleys. Agriculture was not the sudden invention of some creative genius acting out of intuition, but a shaping and combining of the existing repertoires of very large numbers of people.

Other areas of human interest probably developed similarly. The arts did not await the emergence of a leisure class. Instead, artistic band members decorated the walls of caves where they lived during certain seasons of the year (Ucko & Rosenfeld, 1967). Antlers recovered from their fire pits contain carvings of star constellations by fledgling astronomers.

[1] Harris, M. (1979). *Cultural materialism: The struggle for a science of culture.* New York: Random House. xii + 381 pp., including bibliography and index.

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Human interest in features of the sky, such as the moon and stars (ubiquitous conditional and/or discriminative stimuli) predated by far the development of agriculture, where its usefulness is obvious. Foreknowledge of moon cycles could, however, predict favorable hunting and fishing, not to mention one of preliterate peoples' greatest fascinations, the menstrual cycle.

> In most band and village societies before the evolution of the state, the average human enjoyed economic and political freedoms which only a privileged minority enjoy today. Men decided for themselves how long they would work on a particular day, what they would work at—if they would work at all. Women, too, despite their subordination to men, generally set up their own daily schedules and paced themselves on an individual basis. . . . If the cultures of modern band and village peoples can be relied upon to reveal the past, work got done this way for tens of thousands of years.
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> With the rise of the state all of this was swept away . . . . ordinary men seeking to use nature's bounty had to get someone else's permission and had to pay for it with taxes, tribute, or extra labor. . . . For the first time there appeared on earth kings, dictators, high priests, emperors, prime ministers, lawyers, and jailers, along with dungeons, jails, penitentiaries, and concentration camps. Under the tutelage of the state, human beings learned for the first time how to bow, grovel, kneel, and kowtow. In many ways the rise of the state was the descent of the world from freedom to slavery. (*Cannibals and Kings,* pp. 69-70)

By the end of the Pleistocene, world population was increasing. Splinter groups did not fare as well as parent groups; strife, feuding, and small-scale wars of territoriality occurred. All of this increased dramatically as an agricultural mode of production began, because there was less good farm land than foraging land and because people now had some fixed resources to protect. The previously established agricultural behavior became more frequent in the several river valleys some 12,000 ± 2000 years ago—just about the time of the disappearance of the Pleistocene Megafauna—as the temperate belts of the earth warmed and dried (*Cannibals and Kings,* pp. 69-82). With diminished herds, the benefits of planting seeds exceeded the benefits of hunting. Some smaller infrahuman mammals (especially goats and sheep) hung around the outskirts of tended fields where eating stubble came to be less costly for the goat than wide foraging on terrain that was becoming more desertlike. The convenience of stationary sources of milk and meat to the humans outweighed the cost of the grain that kept the goats and cows nearby. As more land came to be planted, harvests increased. The seeds from the grain, unlike the meat from the great herds, could be stored and eaten later without lost nutritive value.

These several variables—the depletion of the great herds, the slow settling down to sedentary agriculture, the domestication of cloven-hooved species, a grain-storage technology, the maintenance of fixed areas of land—and not the biting of an Eden garden apple—produced the downfall of humans. The intensification of agricultural production relieved the increasing population pressures only temporarily. Although hunters can improve their hunting skills, they cannot increase their prey in the same sense that a farmer can intensify his production of domestic grain and goats. Individuals who could increase production to match the increased reproduction became valuable to the survival of social groups.

> Anthropologists refer to the intensifiers of agricultural production as 'big men.' . . . Under certain ecological conditions, and in the presence of warfare, these food managers could have gradually set themselves above their followers and become the original nucleus of the ruling classes of the first states. (*Cannibals and Kings,* pp. 70-71)

A Big Man who controlled the granary could support a protective army. This need for soldiers increased further the value of male over female infants. As redistribution became customary, centers for redistribution—tombs, monuments, pyramids, henges, temples—came

into existence. Over many generations slow shifts in redistribution practices occurred: from giving grain followed by a feast to giving money as tax followed by a feast; from redistributing food immediately at a feast to promises of much greater redistributions in a forthcoming life after death.

> What I find most remarkable about the evolution of pristine states is that it occurred as the result of an unconscious process: The participants in this enormous transformation seem not to have known what they were creating. By imperceptible shifts in the redistributive balance from one generation to the next, the human species bound itself over into a form of social life in which the many debased themselves on behalf of the exaltation of the few. (*Cannibals and Kings,* pp. 81-82)

SOURCES

The preceding scenario is a paraphrased version of an innovative theoretical position in anthropology. The major proponent is Marvin Harris, whose wide range of publications has established him as one of the discipline's foremost theorists (e.g., *The Rise of Anthropological Theory,* 1968; *Cultural Materialism: The Struggle for a Science of Culture,* 1979) as well as one of its most engaging ambassadors (e.g., *Cows, Pigs, Wars and Witches,* 1974; *Cannibals and Kings,* 1977; *America Now: The Anthropology of a Changing Culture,* 1981). The foundations of Harris' theory involve the sequence of production, reproduction, intensification, depletion, more intensification, and so on, as sketched above in the scenario. Although his conceptual terms are different from those of the behaviorist, it is clear that these processes take place as enviromental variables change, operating in turn to shape behavior in new directions or to alter the reinforcers maintaining response classes relative to each other.

Behavior analysts should be reading Harris. He is a friend. An interviewer in *Psychology Today* (Tavris, 1975), concentrating on Harris' views of sex roles, overlooked the relevance of his writings to extensions of the analysis of behavior (e.g., Skinner, 1953). Both Harris and Skinner offer explanations of nonlaboratory behavior that include a suggested history of behavior-environment interactions and a system of principles describing how behavior is affected by classes of environmental events. Harris and Skinner differ in their identifications of the kinds of behavior deemed worthy of analysis. Behavior analysts try to identify the fundamental principles of the behavior of individual organisms. The particular topography of the behavior or the kind of organism that emits it is secondary. Harris is interested in behavior that becomes characteristic of a social group. Having identified such behavior, he then attempts an analysis in terms of benefits and costs, much as Skinner does with reinforcers and punishers. This seems a compatible division of labor between social and behavioral sciences.

So far anthropologists in general have overlooked the relevance of behavior analysis to anthropology. Simple parsimony would recommend it over its competitors (e.g., Piagetan conservation in Cole & Scribner, 1974). But anthropologists, like mainstream psychologists, have opted for less parsimony and greater vagueness (e.g., Simoons, 1979).

Harris tries to cut through proliferating anthropological concepts much as Skinner tried to reduce psychological terminology to a relatively few empirical notions. Both have been viewed as outside the mainstream of their respective fields. One difference is that Harris frequently cites his critics and opponents at length (*Cultural Materialism,* pp. 115-341), whereas Skinner's publications are characterized by especially sparse reference lists (but see Skinner, 1984, pp. 947-950, for an exception). Given the greater likelihood that authors read articles in which they are cited, it seems likely that Harris makes contact with a broader spectrum of anthropologists than do behavior analysts with mainstream psychologists.

CULTURAL MATERIALISM

Harris calls his outlook Cultural Materialism. The resemblance between this and the label of dialectical materialism is clearly deliberate. His acknowledged indebtedness to

and quoting of Karl Marx will seem excessive to psychologists who seldom cite 19th-century sources. For anthropologists, however, dialectical materialism and structural Marxism are positions to be reckoned with (*Cultural Materialism,* pp. 141-164, 216-257). Cultural materialism differs sharply from conventional Marxist materialism in rejecting the inevitability of the Hegelian dialectic and in stressing means of reproduction, ecology, and epidemiology, in addition to the more familiar means of production, as fundamental variables determining patterns of social behavior. Means of reproduction may be read as the "production," if you will, of human beings; in other words, it refers to demographic patterns in human populations.

Cultural materialism differs from mainstream anthropology in ways that are analogous to the differences between behavior analysis and mainstream psychology. For example, cultural materialism argues that overt responses to environmental variables are followed by verbal (mental) rationalizations or attributions of why the responses occur (*Cultural Materialism,* pp. 58 ff). This is in contrast (Harris argues) to the prevalent assumption among anthropologists that thoughts and mental processes (cognitions) precede (or cause) behavior.

> The mode of production in material life determines the general character of the social, political, and spiritual processes of life. It is not the consciousness of men that determines their existence, but on the contrary, their social existence determines their consciousness. (Marx, 1859, cited in *Cultural Materialism,* p. 55)

> Production of the immediate material means of subsistence . . . forms the foundation upon which state institutions, the legal conceptions, the art and even the religious ideas of the people concerned have evolved, . . . instead of *vice versa* as has hitherto been the case. (Engels' eulogy at Marx's grave, cited in *Cultural Materialism,* pp. 141-142)

> The human intuition concerning the priority of thought over behavior is worth just about as much as our human intuition that the earth is flat. (*Cultural Materialism,* p. 60)

These contrasts seem to parallel those between behavior analysis and contemporary cognitive theory (e.g., memory [Wasserman, 1981], social behavior [Mook, 1983]). In social psychology, the maxim that one must change attitudes before changing behavior is frequently cited (e.g., Fishbein & Ajzen, 1975) to illustrate the prior control of cognition over behavior, although the maxim often lacks empirical support (O'Riordan, 1976; Wicker, 1969). At least one social psychologist has argued the opposite (Bem, 1972)—that one must change behavior before changing attitudes. Unlike Harris or Bem, behavior analysts view this issue as an empirical relationship among verbal and nonverbal response classes (Lloyd, 1980), which may or may not be functionally related to prior verbal behavior (Catania, Matthews, & Shimoff, 1982; Risley & Hart, 1968). Any relationships that do exist presumably depend upon reinforcement histories.

Finally, behaviorism and cultural materialism seem to share a general optimism in outlook, in the sense that human behavior is seen as a function of observable variables that, at least in theory, can be changed, thereby changing behavior. These are optimistic outlooks in comparison to those that stress mental structures or biological origins. Changing the variables that control behavior is sometimes ignored or viewed pessimistically as tragedy (Hardin, 1968) or as "the remorseless workings of things" (Whitehead, 1925, p. 17).

PRINCIPLES OF CULTURAL MATERIALISM

The major components of anthropological theory in cultural materialism are infrastructure, structure, and superstructure. Infrastructure includes the means of production and reproduction. Every society must cope with subsistence levels and population size in terms of its existing habitat and technology. The infrastructural component includes food sources and the skills with which people obtain food from these sources. The stability of the food sources in turn depends upon other infrastructural variables, such as geological and meteorological factors, as well as the ways in

which people reproduce. The stable birth rate of ice age hunter-gatherers was a part of their infrastructure that contributed to their well being. The structural and superstructural components refer to social behavior involved in domestic (intragroup) economies and political (intergroup) economies and to institutional features such as religion, recreation, and the arts. Including the means of reproduction within the infrastructure rather than within structure or superstructure is important, because infrastructural variables are considered primary, determining both structural and superstructural features. For example, birth rates, rather than being explained in terms of religious beliefs (a superstructural variable), are related to protein and carbohydrate in the diet and to variables that affect nursing. Structural and superstructural features develop secondarily from this infrastructural base. This is Harris' principle of infrastructural determinism and is, of course, the basis for much of his conflict with cognitively oriented anthropologists.

The primacy of infrastructure is based upon two fundamental notions: humans, like other species, "must expend energy to obtain energy . . . and . . . our ability to produce children is greater than our ability to obtain energy for them" (*Cultural Materialism*, p. 56). The study of social groups becomes an analysis of how the groups arrange "a balance between reproduction and the production and consumption of energy" (*Cultural Materialism*, p. 56). Infrastructure is the basic interface between culture and nature; structure and superstructure are increasingly remote from this fundamental relation. "Nature is indifferent to whether God is a loving father or a bloodthirsty cannibal. But nature is not indifferent to whether the fallow period in a swidden field is one year or ten" (*Cultural Materialism*, p. 57).

This distinction in terms of nature's indifference or lack thereof has implications for a general issue in anthropology: when to expect differences or similarities in cultural practices. Although anthropology has recognized both cultural differences and similarities, it typically has not emphasized criteria for identifying their occurrence. The preceding quotation (on fallow periods) suggests one possible set of criteria. To illustrate, the ways of building houses are notoriously similar around the world.

> A strange conservatism marks the entire development of housing. Certainly men have not concentrated interest or attention on the problem of providing functionally sound housing with anything like the degree of assiduity with which problems of myth making, religion, art, song and dance have been treated. (Hoebel, 1972, p. 290)

Houses are built with sloping roofs because these shed rain or snow and with walls because these repel wind and temperature extremes. Physical and environmental variables are certainly recognized but are not stressed, and discussions of houses may be lumped with discussions of number systems, myths, or religion.

In behavioral terms, similar patterns of behavior across cultures (seeking shelter, devising a number system) may depend upon the maintenance of these repertoires by common consequences that derive from natural laws rather than upon verbal behavior indirectly related to those laws. The fertility of a swidden field is more a function of the chemical composition of the ashes from burned trees and brush than it is of the incantations of the local priest. For a contrasting example, consider that in Papua New Guinea linguists recognize some 700 different languages among the village groups. Many of these languages differ in their number systems. Some use base ten, like European systems; others use base 5, 15, or 20, all of which appear correlated with various combinations of thumbs, fingers, and toes (Lancy, 1978). Still other systems use base 53 or 63, which locate ordinal positions on many more body parts (the odd-numbered base derives from humans' having only one nose). Despite these varying verbal organizations of the number system, Papuans counting their valuable pigs rely on ordinal systems that provide a count corresponding to the nonverbal number of pigs in the village.

Although Harris analyzes structural and superstructural factors in the same way as he

analyzes infrastructural variables, he does not lump them together. Instead he searches the infrastructure for revelant variables determining the structure, and the structure for variables likely to determine the superstructure. The problem he sees in the relationship between production and reproduction is that cultures have used their technological improvement of energy consumption not to reduce permanently the labor requirements specific to a given mode of production or to improve living conditions over the long term, but to produce more children. The resulting demographic crises, in turn, produced contingencies that reinforced shifts to ever more energy-expensive modes of production. Harris argues that during the last 3000 years (at least in the norther hemisphere) our changing technologies in agriculture and warfare have increased the hours we work, the people we kill, and the babies we produce (in comparison to the relatively stable systems that existed in prehistory). We could halve our population instead of working twice as hard, but "one large problem"—namely, heterosexual activity— interferes (*Cannibals and Kings*, p. 5).

STRUCTURE AND SUPERSTRUCTURE AS A FUNCTION OF INFRASTRUCTURE

Harris does not end his analysis with the infrastructural problems of production and reproduction. His work is most interesting and most controversial when he analyzes a particular feature of structure or superstructure in terms of its infrastructure. Readers will not be surprised to learn that domesticated plants and animals peculiar to the ecological climate of, say, Palestine flourish there, but specific hypotheses about how that infrastructure led to a priestly taboo on eating pork, as well as eating food from a host of other species, may be unexpected (*Cannibals and Kings*, p. 134). Harris, however, proceeds energetically to offer environmentally observable variables to account for specific structural and superstructural customs.

The problem is not only to explain how this or that animal (including the human one) is labeled edible or inedible, but also to explain how cannibalism developed in the Mexican Highlands and not in Europe, China, Peru, or the Pacific Northwest; or how the pig was eaten in China but was vilified and not eaten in the Middle East, whereas the cow was not only not eaten but deified in India.

One could ask a sample of the people involved how the practice began, but, in Harris' view, verbal descriptions of their cultural practices (their superstructure) evolved after (not before) the cultural practices were generated by infrastructural variables.

> What people think or imagine is contemptible to the gods cannot be taken as an explanation of their religious beliefs and practices. To do so is to rest the explanation of all social life ultimately on what people arbitrarily think or imagine—a strategy doomed to nullify all intelligent inquiry since it will always come down to one useless refrain: People think or imagine what they think or imagine. (*Cannibals and Kings*, p. 120)

Instead of beginning with the verbal reports of natives, Harris analyzes infrastructure. The origins of the sacred cow and the tabooed pig (*Cannibals and Kings*, pp. 127-152) derive from parallel analyses. As the glaciers melted and the world dried, early Indians and early Middle Easterners raised cattle, sheep, goats, wheat, millet, and barley, and they ate meat. To understand the pork taboo in the Middle East, Harris notes that cows, sheep, and goats can be easily herded, two of them not only readily produce milk but can be trained to pull plows or carts, and the third repeatedly produces wool. Pigs, on the other hand, whose skin requires considerable moisture, are a liability in a climate becoming increasingly dry. Moreover, pigs are difficult to herd, do not readily pull a plow or wagon, and cannot be milked. Farmers who discarded their pigs were probably more prosperous. An outright ban on the eating, if not the production, of pigs safeguarded against unprofitable farming.

To understand the beef taboo, Harris notes that although Indians also experienced the intensification of agriculture, depletion of resources, and growth of population density

that had occurred in the Middle East and China, population density increased more in the Ganges River valley than elsewhere.

The Gangetic plain, which had once been tree covered, had no trees by 300 B.C., when the beef taboo became widespread. As the risk of drought increased, farms became smaller and space for animals decreased. Traction animals were essential. Without horses or donkeys the burden of pulling a plow fell to the oxen. The farmer who ate his beef was not able to plow his fields. The taboo of beef removed this temptation, much as that of pork had done. But this does not explain why the pig was abominated while the cow was deified. According to Harris, the difference occurrs because pigs have but one value (meat) whereas bovines have more than one (meat, milk, and traction). Oxen plow more efficiently than cows, but though the meat of both is tabooed, only the cow is deified. Despite their role as goddesses, cows roam freely as scavengers in rural and urban areas of India and Nepal but oxen are carefully stabled each night. The Indian cattle census reveals a 200:100 ratio favoring oxen:cows where male traction animals are needed. This ratio varies across India depending upon availibility of feed and upon availability of alternative traction animals (Vaidyanathan, Nair, & Harris, 1982). The ratio drops to 67:100 where traction needs are low and food is scarce (*Cultural Materialism*, p. 38). Harris interprets these sex ratios as indicating some form of unspoken bovicide (e.g., Hindu farmers sometimes may gently, or possibly not so gently, shove newborn calves away from the cow's teats [*Cultural Materialism*, pp. 32-33]).

Harris' critics argue sharply at this point (see Freed & Freed, 1981, for a vigorous sampler) that the behavior of Hindu farmers is controlled by religious beliefs and not by the cost/benefit ratios of feeding oxen. Harris does not deny that now, and in recent history, religious teachings together with social sanctions control some behavior of Hindu people. Unlike his critics, however, he distinguishes between the evolution of social customs with changes in infrastructural variables and the subsequent maintenance of these new customs. This situation is reminiscent of the difficulties some psychologists encounter with distinctions between transition states and steady states of behavior (e.g., Chapman & Jones, 1980, where Hullian and operant analyses are repeatedly confused).

EMICS AND ETICS

The distinction between nonverbal and verbal behavior is implicit in Harris' account of the way in which infrastructural variables precede the verbal trappings that subsequently develop to rationalize social customs. For example, what Hindu farmers *say* about sacred cows and what they *do* about them when food is scarce are apparently under the control of different contingencies. Confusion arises when anthropologists do not distinguish between what they (the anthropologists) say about what Hindu farmers say and what they (the anthropologists) say about what Hindu farmers actually do. Harris treats these parallel accounts (what the natives say and what the visiting anthropologists later write) in his discussion of emic and etic events (*Cultural Materialism*, pp. 38-41). He describes how an anthropologist's account of village customs (an etic analysis) might differ from a native's account, and how a native's account of the same custom might differ from how natives act (a mental and behavioral emic analysis). Instead of considering these various combinations as controlled by different contingencies, Harris assigns the responses of natives and of anthropologists to different formal categories—namely, mental and behavioral domains, and emic and etic domains.

Harris treatment of the emic-etic domain may derive from his view of language as some mixture of formal linguistics and functional analysis. Some of his discussion is consonant with a behavioral view of language and some is not. Unlike all other social behavior described in *Cannibals and Kings* and *Cultural Materialism*, language is generally viewed as separate and distinct from infrastructural variables (*Cultural Materialism*, pp.54-55). Harris' separation of language and infrastructure represents a major difference between cultural materialism and behavior analysis.

Perhaps generally accepted practices and theories of language throughout the social sciences, including anthropology and psychology, contribute to this difference. In conducting field work, anthropologists (more than other scientists) must acquire skill in a local language. When learning a language, anthropolgists frequently rely on missionary organizations (e.g., Wycliffe Bible Translators) for practical language instruction. "But the theories (anthropologists) use for learning languages and for understanding them are different" (Johnston & Selby, 1978, p. 318, parentheses added). When trying to understand language, anthropologists (and other social scientists) often rely on Chomsky's (1975) transformational grammar. This wide divergence of practice and theory must serve to maintain our traditional ways of viewing language as somehow distinct from behavior.

AN INTERFACE

Harris offers an account of behavior remarkably compatible with behavior analysis; behavioral principles are not yet seen as compatible with cultural materialism. Anthropologists present human behavior within an impressive and comprehensive evolutionary and social context based on observations combined with principles from archeology, biology, chemistry, geology, linguistics, and psychology. The context is more extensive than any in psychology. When they rely on psychology, their emphasis, not surprisingly, centers upon instances of the occult and the abnormal rather than on more general, empirically established, principles of behavior (see Mead, 1930, pp. 279-292). In fact, some anthropologists would argue that it is *their* task to make explicit a set of principles of behavior rather than to use those of psychology. Although anthropologists seem careful to select well established concepts from other sciences, they appear to become less selective with psychological concepts. But the potential applicability to anthropology of an analysis of behavior might include: methods of obtaining measures of interobserver reliability in applied settings; stress on functional definitions relating responses to environmental events (as Harris relates behavior to contingencies arising from the infrastructure); emphasis on steady states of behavior rather than on transitional states (as Harris distinguishes current cultural practices from their origins); the distinction between stimulus control and reinforcement control; and the comparison of cross-species data bases in psychology with cross-cultural data bases in anthropology (Saigh & Umar, 1983).

Harris provides an impressive beginning from which a dialogue may develop. For behavior analysts, a conversation with Harris is immediately more rewarding than one with many a mainstream psychologist. Harris has already debated (*Cultural Materialism*, pp. 117-341) theoretical alternatives with which behavior analysts are acquainted—structuralism, cognitivism, eclecticism. Given that conflicting theories are not an issue, the conversation can begin immediately with the interaction of behavior and infrastructure.

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